

REMARKS

Claims 16-24 and 26 are pending in the current application. In an office action dated May 22, 2007 ("Office Action"), the Examiner maintained a previous restriction requirement, rejected claims 16-24 and 26 under 35 U.S.C. §112, second paragraph, rejected claims 16-24 and 26 under 35 U.S.C. §101, and rejected claims 16-24 and 26 under 35 U.S.C. §102(a) as being anticipated by Bozinov, IEEE Transactions on Nanobioscience, Vol. 2, No. 4, pages 215-220, 2003 ("Bozinov"). Applicant's representative will file a petition to the Commissioner for Patents regarding the requirement for restriction, under 37 C.F.R. § 1.144, in a separate mailing. Applicant's representative has amended claims 16 and 26, in view of the Examiner's 35 U.S.C. §112, second paragraph, rejection, and wishes to thank the Examiner for detecting the lack of antecedent basis for the term "microarray." Applicant's representative respectfully traverses the remaining claim objections and the 35 U.S.C. §101 and 35 U.S.C. §102(a) rejections of claims 16-24 and 26.

With respect to the 35 U.S.C. §112 rejection of claims 16, 20, 22, 23, 24, and 33, Applicant's representative disagrees that the limitation "regularly shaped region" is unclear and not defined in the specification. Applicant states, in the paragraph spanning lines 10-22 of page 17 of the current application:

Embodiments of the present invention employ pixel-based analysis techniques in order to transform an irregularly shaped region identified by a user as suitable for feature extraction, such as region 1204 in Figure 12, into an easily described, regular region, such as a rectangular region. Irregular regions are not easily described mathematically or algorithmically, and often have low symmetry, two quite related aspects. Quite often, an irregular region needs to be described by a curved perimeter, generally by a large set of points at reasonable intervals along the perimeter, the interval length needed, or needed resolution, depending on the maximum curvature of the perimeter. Regular regions, by contrast, have relatively high symmetry, and can be easily described mathematically and/or algorithmically. For example, it is very difficult to determine an analytical function or a simple algorithm to describe or construct a misshapen blob. By contrast, a square can be simply described by the coordinates of two, particular vertices.

The above paragraph quite clearly defines the limitation "regularly shaped region." The

phrase "regularly shaped region" is quite well understood by those familiar with mathematics and mathematical characterization of two-dimensional shapes and three-dimensional volumes, and includes the symmetrical and easily characterized shapes mentioned in claim 24. In an article on finding the center of mass of rigid bodies provided by the Connexions web site, at <http://cnx.org/content/m14120/latest/>, the following discussion of regularly shaped bodies can be found:

Rigid bodies are composed of very small particles which interact with each other via electromagnetic force. They form a continuous distribution of mass. As such, expressions of COM in three coordinate directions involve evaluation of integrals as described in earlier module. This evaluation, however, is rendered difficult on two counts:

Mass distribution may not be uniform.
The body shape may be irregular.

The geometry of regularly shaped bodies are defined by mathematical equations. Such is not the case with irregular bodies. However, there is a good thing about center of mass (COM) that it represents the point where external force equivalently applies. This fact allows us to experimentally determine COM of even irregularly shaped bodies. We can balance a body on a pointed wedge. The COM of the body falls on the line of balance. In order to know the COM (a point), however, we need to balance the body with different orientation to get another line of balance. The point of intersection of the two lines of balance is the COM of the body.

Hopefully, the Examiner can appreciate similarity of the discussion in the Connexions article with the above-quoted paragraph from the current application. Again, the phrase "regularly shaped region" is well understood by those even cursorily familiar with mathematics, particularly in view of the above-quoted paragraph. As the Examiner must certainly appreciate, assigning a definition to a phrase or term in a claim from a general-purpose, English-language dictionary, when the term or phrase is defined in the specification and has a well-known and well-understood meaning in the field of science or technology to which the application containing the claim is directed, violates basic principles of claim interpretation, as outlined in many Federal Circuit opinions and in the M.P.E.P. Moreover, Applicant's representative cannot find the definition provided by the

Examiner in the Merriam-Webster Online Dictionary, and doubts whether the phrase "regular shape" is defined in any general-purpose English-language dictionary. The quoted definition applies to a regular polygon. A regular polygon is indeed a regular shape, but regular polygons are a distinct subset of regular shapes. A circle or disk is also a regular shape, but is not a regular polygon. The Examiner might more profitably consult a mathematical dictionary, such as the Wolfram dictionary, for mathematically-related terms. In the current instance, there is, of course, no need to consult external sources, since the meaning of the term is quite adequately discussed in the current application.

Rejecting claims 16-24 and 26 under 35 U.S.C. §101, the Examiner quotes 35 U.S.C. §101, and then proceeds to reject the claims based on a lengthy narrative spanning pages 3, 4, and 5 of the Office Action. The Examiner refers to a judicial exception of a computational algorithm, a requirement for including a step of physical transformation, a discussion of usefulness, and a rather bizarre, conclusory characterization of a step of the instant claims as being an intermediate result, and not a final result, and therefore not patentable. Not a single statement of this narrative is accompanied by a reference to a rule, statute, or a court decision that would support the statement. Please note that "judicial exception," "physical transformation," and "final result" do not occur anywhere in 35 U.S.C. §101.

Much of the narrative included in the rejection of claims 16-24 and 26 under 35 U.S.C. §101 appears to be arbitrarily modified and reinterpreted portions of Section IV.C.2 of the "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" ("Guidelines"). Section I IV.C.2 of the Guidelines is entitled "Determine whether the claimed invention is a practical application of an abstract idea, law of nature, or natural phenomenon" (§101, Judicial Exceptions). Next, please consider claim 16, provided below:

16. (original) A microarray data processing system comprising:
 - a processor;
 - stored, computer readable microarray data;
 - a display device and a user input device; and
 - a program that

renders the microarray data for visual display;
displays the microarray data rendered for visual display;
receives a boundary of a region of feature extractability
within the microarray; and
constructs a regularly shaped region of feature
extractability from the received boundary of the region of feature
extractability within the microarray.

Claim 16 claims a microarray data processing system that includes a processor, stored microarray data, display device, and a program that carries out various types of processing of microarray data. Claim 16 is not directed to an abstract idea, law of nature, or natural phenomenon. A processor is, as is well known to anyone even cursorily familiar with computer hardware, electronics, or just about any modern technology, a physical object, rather than an abstract idea, law of nature, or natural phenomenon. The various processes carried out by the claimed program included in the microarray data processing system to which claim 16 is directed are processes, rather than abstract ideas, laws of nature, or natural phenomena. Nothing in the guidelines, in current federal case law, or in any statute or rule Applicant's representative is aware of, justify classifying a physical microarray data processing system that carries out a number of well-defined and well-described processes as an abstract idea, law of nature, or natural phenomenon. The rejection of claims 16-24 and 26 under 35 U.S.C. §101 is completely unjustified and unsupported. Furthermore, much of the narrative spanning pages 3-5 of the Office Action related to the 35 U.S.C. §101 rejections does not reflect content of the Guidelines, or any other rule, statute, or case law. Were, for example, an Examiner allowed to arbitrarily characterize the results of a process as being "final" or "intermediate," and reject the claimed process based on such arbitrary definitions, then the rejection would be arbitrary and capricious, and violate basic due-process obligations of administrative agencies as encoded in the Administrative Procedures Act.

Applicant respectfully traverses the 35 U.S.C. §102 rejections of claims 16-24 and 26 under 35 U.S.C. §102(a) as being anticipated by Bozinov. In rejecting claims 16 and 26, the Examiner states:

Regarding claims 16 and 26, Bozinov teaches a software system, which would require a process, stored microarray data, and a display device and user input device (abstract), with a program that renders and displays the

microarray data for visual display (page 217, Figure 1; page 219, Figure 5), receives a boundary of a region of feature extractability within the microarray (pages 218-219), and constructs regularly shaped region of feature extractability from the received boundary of the region of feature extractability (pages 281-219).

This rejection falls far short of the requirements of a *prima facie* anticipation rejection, as discussed in M.P.E.P. §2131, requiring, for example, that each and every element of an anticipated claim be found in the anticipating reference.

As one example of the deficiency of the rejection of claim 1, for the claim limitation "receives a boundary of a region of feature extractability within the microarray," the Examiner cites pages 218-219 of Bozinov. Pages 218-219 of Bozinov discussed a fully automated, algorithmic method for clustering pixels of a microarray image into foreground and background classifications, assignment of pixel rows and columns to foreground or background classifications, and hybrid clustering of pixels of or near a feature. There is not a single teaching, mention, or even suggestion, on pages 218-219 of Bozinov, of any kind of reception of "a boundary of a region of feature extractability." Moreover, in Bozinov's abstract, Bozinov states the goal of the web-based system described in Bozinov: "Ideally, a web-system with input solely confined to a single microarray image and a data table as output containing measurements for all gene spots would directly transform raw image data into abstracted gene expression tables." In other words, Bozinov explicitly states that the only input to Bozinov's system is a microarray image. Bozinov explicitly excludes any reception of "a boundary of a region of feature extractability." By contrast, beginning on line 10 of page 16 of the current application, one embodiment of the step of receiving "a boundary of a region of feature extractability within the microarray" is described as a user manually drawing a contour line over a visually displayed image of the microarray, the contour line then submitted to the claimed "microarray data processing system" for reception by the program included in the microarray data processing system. Bozinov does not teach, mention, or suggest this step, and explicitly states that such steps are not employed in Bozinov's web-based microarray image analysis system.

As another example of the deficiency of the rejection of claim 1, the cited

pages of Bozinov, pages 218-219, do not once teach, mention, or suggest "feature extractability," "constructing a regularly shaped region of feature extractability," "constructing a regular shaped region of feature extractability from the received boundary of the region of feature extractability," or "extracting feature signals from the regularly shaped region of feature extractability." Instead, Bozinov describes, on pages 218-219, an algorithm for classifying pixels, rows, and columns within a microarray image as foreground or background. Such classifications have nothing to do with feature extractability. Applicant's representative respectfully points the Examiner to a portion of the current application beginning on line 24 of page 14 that discusses portions of microarrays damaged by mishandling, inadvertently contaminated or otherwise chemically modified during experimental procedures, and/or containing manufacturing defects that are unsuitable for feature extraction. The current application also clearly discusses how regions of feature extractability are defined currently by users of microarray-data-processing systems, in subsequent paragraphs, and then carefully and completely describes the claimed system for identifying regions of feature extractability. Figure 9 of the current application illustrates a region of extractability (908 in Figure 9) within a microarray image containing defective or damaged regions (904 and 906). Again, Bozinov is concerned with classification of pixels as belonging either to features or to background, and does not teach, mention, or suggest anything related to evaluating microarray data for feature extractability.

In summary, the 35 U.S.C. §101 rejections of claims 16-24 and 26 are unsupported and unsupportable. Data-processing systems are not abstract ideas, laws of nature, or natural phenomena. The re-interpreted and mischaracterized portions of the Guidelines are not applicable to the current claims. The 35 U.S.C. §102(a) rejections of claims 16-24 and 26 fall quite short of the requirements for a *prima facie* anticipation rejection. Bozinov does not teach, mention, or suggest any kind of feature-extractability method or system for evaluating feature extractability, and explicitly states that the Web-based Microarray Image Analysis software system receives only a microarray image as input. Bozinov does not even remotely suggest the currently claimed invention. Because claim 16 is not anticipated by Bozinov, neither are dependent claims 17-24 that depend

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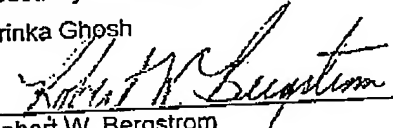
from claim 16.

In Applicant's representative's opinion, all of the claims remaining in the current application are clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

Respectfully submitted,

Srinka Ghosh

By


Robert W. Bergstrom
Attorney/Agent for Applicant(s)

Reg. No. 39,906

Enclosures:

Postcard

Transmittal in duplicate

Olympic Patent Works PLLC
P.O. Box 4277
Seattle, WA 98194-0277
206.621.1933 telephone
206.621.5302 fax